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Information and Communication Technology (ICT) among School-going Children: A Technological Intervention

Rashmi Pramanik
Department of Anthropology
Sambalpur University, Jyoti vihar- 768019
E-mail: rashmipramanik@yahoo.co.in

Abstract

Information and Communication Technology (ICT) is universally acknowledged as an important catalyst for social transformation and national progress. India, a successful ICT powered nation, has always laid a lot of accent on the use of ICT, not only for good governance but also in diverse sectors of the economy such as health, agriculture, education etc. The present study has been conducted among the school-going children of Sambalpur, a small city in the western part of Orissa, India. The paper discusses a very vital contribution of ICT in the field of education that is, easy access to learning resources. The paper throws light on another distinctive feature of ICT, i.e., anytime-anywhere. The paper unearths how ICT has acted as a perfect motivating tool. Thus, ICT in recent years is an extremely powerful agency affecting social relations and patterns of social interaction significantly.

Keywords: E-learning, School-going children, Technological intervention, Easy access, Motivating tool

1. Introduction

Information and communication technology (ICT) is a force that has changed many aspects of the way we live. If one was to compare such fields as medicine, tourism, travel, business, law, banking, engineering and architecture, the impact of ICT across the past two or three decades has been enormous. The way these fields operate today is vastly different from the ways they operated in the past. But when one looks at education, there seems to have been an uncanny lack of influence and far less change than other fields have experienced. A number of people have attempted to explore this lack of activity and influence (Soloway and Prior, 1996; Collis, 2002). There have been a number of factors impeding the wholesale uptake of ICT in education across all sectors. These have included such factors as a lack of funding to support the purchase of the technology, a lack of training among established teaching practitioners, a lack of motivation and need among teachers to adopt ICT as teaching tools (Starr, 2001). But in recent times, factors have emerged which have strengthened and encouraged moves to adopt ICTs into classrooms and learning settings. These have included a growing need to explore efficiencies in terms of program delivery, the opportunities for flexible delivery provided by ICTs (Oliver & Short, 1997); the capacity of technology to provide support for customized educational programs to meet the needs of individual learners (Kennedy and McNaught, 1997) and the growing use of the Internet and World Wide Web(WWW) as tools for information access and communication (Oliver & Towers, 1999). As we move into the 21st century, these factors and many others are bringing strong forces to bear on the adoption of ICTs in education and contemporary trends suggest we will soon see large scale changes in the way education is planned and delivered as a consequence of the opportunities of ICT. The evolution of technology has an impact on the way we live, work, teach and learn. Over the past few decades, technology has completely transformed our lives in all possible ways. India, a successful ICT powered nation, has always laid a lot of accent on the use of ICT, not only for good governance but also in diverse sectors of the economy such as health, agriculture and education. Education undoubtedly is one of the most important investments in building human capital in a country and a medium that not only sculpts good literate citizens but also makes a nation technologically innovative, thus paving a path to economic growth. In India, many programmes and schemes such as free and compulsory primary

education, 'Education for All' Movement (Sarva Shiksha Abhiyan), National Literacy Mission, etc have been launched by government to improve the educational system. But in recent years there has been a groundswell of interest in how computers and the Internet can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings. Although most commonly associated with higher education and corporate training, e-learning encompasses learning at all levels, that uses an information network—the Internet, an intranet (LAN) or extranet (WAN) whether wholly or in part, for course delivery, interaction and/or facilitation. ICT helps in providing a catalyst for rethinking teaching practice (Flecknoe, 2002; McCormick & Scrimshaw, 2001) developing the kind of graduates and citizens required in an information society (Department of Education, 2001); improving educational outcomes (especially pass rates) and enhancing and improving the quality of teaching and learning (Wagner, 2001; Garrison & Anderson, 2003). ICTs have the potential for increasing access to and improving the relevance and quality of education. It thus represents a potentially equalizing strategy. However, the reality of the Digital Divide—the gap between those who have access to and control of technology and those who do not—means that the introduction and integration of ICTs at different levels and in various types of education will be a most challenging undertaking. Failure to meet the challenge would mean a further widening of the knowledge gap and the deepening of existing economic and social inequalities.

2. Area of Study

The study was conducted among the school-going children covering two different high schools of Sambalpur, a city in the western part of Orissa. The two high schools for the present study are namely: St. Joseph's Convent High School and Madnabati Central Public School. Both are English medium public schools. The students follow two different types of course curriculum, viz. Indian Certificate Secondary Examination (ICSE) and Central Board of Secondary Education (CBSE). Students of class X, class XI and class XII were selected as the primary respondents. The teaching and learning process in the sample schools is done by ICT method.

3. Methods of Data Collection

Relevant information is gathered with the help of interview schedule and observation method. Besides, these case study and group discussion method was also used to supplement our analysis. Information was also gathered from the teachers as well as the parents of the primary respondents. Both male and female students are included in the sample. Data was collected from a total number of 120 respondents. Equal number of respondents was selected from each school.

4. Objectives

Keeping these factors in mind the major objectives of the present study are:

- To assess the views taken from the school-going children with regards to how ICT is an easy access to learning
- To find out how technological intervention bridges down the gap between time and space
- To discuss ICT as a motivating tool for the students
- To throw light on the contribution of visual art, which is a boon for the present generation

5. Major Findings

ICTs are a potentially powerful tool for extending educational opportunities, both formal and non-formal, to previously underserved constituencies—scattered and rural populations, groups traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others who for reasons of cost or because of time constraints are

unable to enroll on campus. Improving the quality of education and training is a critical issue, particularly at the time of educational expansion. ICTs can enhance the quality of education in several ways: by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment. If designed and implemented properly, ICT-supported education can promote the acquisition of the knowledge and skills that will empower students for lifelong learning. When used appropriately, ICTs—especially computers and Internet technologies—enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way. These new ways of teaching and learning are underpinned by constructivist theories of learning and constitute a shift from a teacher-centered pedagogy—in its worst form characterized by memorization and rote learning—to one that is learner-centered.

In the Information and Communication Technology age, the methods in which learners and teachers are engaged in the pursuit and construction of learning is very different from the past. Earlier the students were expected to copy the material dictated by the teacher in their notebooks for later learning and understanding of the content. But now we are faced with new challenges of access and of quality where we need to find new ways of organizing the teaching learning experience. ICT has an impact not only on what students should learn, but it also plays a major role on how the students should learn. Along with a shift of curricula from “content-centred” to “competence-based”, the mode of curricula delivery has now shifted from “teacher-centred” forms of delivery to “student-centred” forms of delivery. My observation in the present study makes me feel that with the introduction of ICTs in the classroom, the teacher’s role in the learning process becomes even more critical. What can and has changed is the kind of role that the teacher plays. The role of students, in turn, has also expanded. ICT-enhanced learning promotes a thematic, integrative approach to teaching and learning. This approach eliminates the artificial separation between the different disciplines and between theory and practice that characterizes the traditional classroom approach. Technology has the capacity to promote and encourage the transformation of education from a very teacher directed enterprise to one which supports more student-centered models. Evidence of this today is manifested in:

- The proliferation of capability, competency and outcomes focused curricula
- Moves towards problem-based learning
- Increased use of the Web as an information source, Internet users are able to choose the experts from whom they will learn

The use of ICT in educational settings, by itself acts as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools (Reeves and Jonassen, 1996), the influence of the technology on supporting how students learn will continue to increase.

In the past, the conventional process of teaching has revolved around teachers planning and leading students through a series of instructional sequences to achieve a desired learning outcome. Typically these forms of teaching have revolved around the planned transmission of a body of knowledge followed by some forms of interaction with the content as a means to consolidate the knowledge acquisition. Contemporary learning theory is based on the notion that learning is an active process of constructing knowledge rather than acquiring knowledge and that instruction is the process by which this knowledge construction is supported rather than a process of knowledge transmission (Duffy and Cunningham, 1996). The strengths of constructivism lie in its emphasis on learning as a process of personal understanding and the development of meaning in ways which are active and interpretative. In this domain learning is viewed

as the construction of meaning rather than as the memorisation of facts (Lebow, 1993; Jonassen and Reeves, 1996). Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student centered settings and by enabling learning to be related to context and to practice (Berge, 1998; Barron, 1998). Since ICTs can open up the classroom to the outside world, the community can also play a new role in the classroom. So a question arises - will ICTs Replace the Teacher? The answer is a resounding NO! As learning shifts from the “teacher- centred model” to a “learner-centred model”, the teacher becomes less the sole voice of authority and more the facilitator, mentor and coach—from “sage on stage” to “guide on the side”. The teacher’s primary task becomes to teach the students how to ask questions and pose problems, formulate hypotheses, locate information and then critically assess the information found in relation to the problems posed. Most of the teachers in the sample schools said that ICT-enhanced learning was a new experience for them. So they have in turn become co-learners and are trying to discover new things along with their students. As a whole the teachers enjoyed the ICT-enhanced instructional style, which was highly motivating to the students and helped in the learning process. On the other hand the feedback from students was very positive. They equally enjoyed learning more and indicated that the Internet material helped them better understand the content of the revised course. The internet materials helped them to get the latest and updated information. Teachers say that they have effective materials, which helped them to illustrate certain points to the students in an easier and faster way. They themselves confessed that internet upgraded their knowledge.

Through the use of technology, students are now encouraged to perform greater self-learning. The effectiveness of ICTs for teaching and learning, however, is largely dependent on how much the context is understood. Thus, there is a need to relate educational technology to actual challenges experienced by both students and lecturers. O’Hagan (1999) suggests that educational technology can be used to present and provide content, assess students learning, provide feedback, scaffold student learning and enable peer-to-peer collaborative learning. Both parents and children in the sample school regard Internet as an excellent source of information. This was cited frequently as a reason for using ICT to complete school work. The interactive nature of CD-ROMs, games and websites was frequently cited as a reason for choosing to complete school work on the computer. This is what a girl of class XII comments on what she feels a computer as:

“It’s like one big encyclopaedia, you can find out anything for your subject, you can even go to the exam board websites and find out the specifications of what you have to do. It’s just a great help, it’s basically like a library”.

Likewise thus states a respondent of Class XI:

“It (computer) affects 99%, it’s just so much easier because through websites you can go on for revision, it has all your topics listed and also the [name]. It is interactive so you can revise that section and do a test on it, then the test comes up and you have a list of what you have to revise”.

The implication of these voices recorded from a couple of students is that the schools need to build on the motivational aspects of ICT in order to technologically educate the students. It clearly reveals how the school-going children interpret computer.

One of the most vital contributions of ICT in the field of education is- Easy Access to Learning. With the help of ICT, students can now browse through e-books, sample examination papers, previous year papers etc. and can also have an easy access to resource persons, mentors, experts, researchers, professionals, and

peers-all over the world. My respondents were quite happy to tell that now they can download NCERT textbooks for all subjects and they have to no longer wait for the availability of the latest issue in the market or buy a new one if one has lost it by mistake. The chapters have been uploaded subject wise in printable PDF format and can be accessed and downloaded anywhere and at anytime. Manoj a student of class XII unearths his feelings saying:

“With English we do projects on them [the computer]. In music even, we do an assignment on the computer...we got to use the Internet and go on like all these music sites. I enjoy making the programs, seeing the programs work once you’ve typed them in. [I] didn’t want to come to school but with more technology, now I want to come to school and do stuff on the computers”.

The above statement given by Manoj reveals his interest towards the use of computers. Earlier he did not even want to come to school but after he has known how to work on computers he has a desire to come to school and do his assignments in computers. The impact of technology has changed his mind set.

The teachers of the sample schools used LCD projectors for PowerPoint presentations while teaching in the classroom. During the interaction with the teachers of the sample schools they said that there was a time when one had to run from pillar to pillar to get their exam results, however since the past few years one can easily view exam result of various academic, entrance and recruitment examinations held by several Boards/Institutions/Commissions (e.g. CBSE, ICSE, State Education Boards, UPSC, SSC, ICAI, GGSIPU etc) easily over the Internet. All one has to do is type his/her roll number at appropriate place on the website and the result/mark sheet is displayed on the screen.

Many students felt that the use of word processing programmes for their school work was beneficial. This aspect of the use of ICT was also frequently mentioned by parents in terms of the reasons why they encouraged its use. The ability to decorate work with clip art and borders was also mentioned by a number of children as a motivating factor. Girls more likely to cited this factor. A large number of children, in particular boys, suggested that they liked using the computer because they disliked writing. Below is what a boy of Class X says:

“Because when you are writing by hand, your wrist gets really tired and it really hurts you. When you are writing on a computer and it doesn’t hurt you, you want to carry on a bit more and a bit more and you don’t feel the need to stop”.

The above comment given by Sandeep shows how he feels that the intervention of technology has made his life easier. He thinks he can work for more hours at a stretch without feeling tired and bore. ICT has lightened his burden.

Another distinctive feature of ICT is - Anytime-anywhere. It has the ability to transcend time and space. Keeping this module in mind, ICT has made digital learning possible. One can now use online course study material, at any hour of the day. ICT-based educational delivery has made all learners and the instructor to be in one physical location. ICTs make possible asynchronous learning, or learning characterized by a time lag between the delivery of instruction and its reception by learners. Online course materials, may be accessed 24 hours a day and 7 days a week. In concert with geographical flexibility, technology-facilitated educational programs also remove many of the temporal constraints that face learners with special needs (Moore and Kearsley, 1996). Students are starting to appreciate the capability to undertake education anywhere, anytime and at any place. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments (Young, 2002).Through online technologies learning have become an activity that is no

longer set within programmed schedules and slots. Learners are free to participate in learning activities when time permits. This freedom has greatly increased the opportunities for many students to participate in formal programs. The wide variety of technologies that support learning are able to provide asynchronous supports for learning so that the need for real-time participation can be avoided while the advantages of communication and collaboration with other learners is retained.

Interacting with the students of the sample schools, they said that neither do they nor their teachers rely solely on printed books and other materials from the libraries which are available in limited quantities. The teachers equally agreed that, with the Internet and the World Wide Web, a wealth of learning materials in almost every subject and in a variety of media can now be accessed from anywhere and at anytime of the day and also by an unlimited number of people. Many students had computer with net facilities at home. While conducting a group discussion among the students in one of the sample schools, they concluded that ICT-supported learning encourages interaction and cooperation among students, teachers, and experts regardless of when and where they are. Additionally, certain types of ICTs, such as teleconferencing technologies, enable instruction to be received simultaneously by multiple, geographically dispersed learners (i.e., synchronous learning).

Another major contribution of ICT for the school-going children is - Motivation to Learn. ICTs such as videos, television and multimedia computer software that combines text, sound, and colourful moving images can be used to provide challenging and authentic content that will engage the student in the learning process. Interactive radio likewise makes use of sound effects, songs, dramatizations, comic skits, and other performance conventions to compel the students to listen and become more involved in the lessons being delivered. Some of the parents of the respondents opined that their children were feeling more motivated than before in such type of teaching in the classroom rather than the stereotype 45 minutes lecture. They were of the view that this type of learning process is much more effective than the monotonous monologue classroom situation where the teacher just lectures from a raised platform and the students just listen to the teacher. In student-centred classrooms there is a focus on individual learning where students are in more control of their learning, use social collaboration, and accept the teacher as facilitator rather than as transmitter of knowledge. It is hoped that the technology will actually change the characteristics of problems and learning tasks, and hence play an important task as mediator of cognitive development, enhancing the acquisition of generic cognitive competencies as essential for life in our knowledge society. The fact that virtually all students believe computers enable hands-on opportunities because they physically push buttons, control a mouse, move the cursor, use different software applications, explore the Internet by following prompts, and comprehend (or not) what's moving on the screen (as opposed to the still text of a book), can change cognitive skills. Swati a student of class X expresses her feelings as thus:

“A computer...it's just more fun. In a book...just the way they pronounce it, it's really boring, but on a computer it's like really colorful and stuff. Some of the web pages and everything, you can click on things and they pop out on the page, instead in a book it's just a page with writing. I suppose the difference is without computers you're just doing it on paper and reading. On computers you're doing it hands-on”.

The statement given by Swati unearths her level of motivation with regards to the use of computers. It seems she was bored by the traditional methods of teaching and learning. Now she feels more excited and enthusiastic while using computers.

The teachers could make their lecture more attractive and lively by using multi-media and on the other hand the students were able to capture the lessons taught to them easily. As they found the class very interesting, the teachings also retained in their mind for a longer span which supported them during the time of examination. More so than any other type of ICT, networked computers with Internet connectivity can

increase learner motivation as it combines the media richness and interactivity of other ICTs with the opportunity to connect with real people and to participate in real world events. ICT-enhanced learning is student-directed and diagnostic. Unlike static, text- or print-based educational technologies, ICT-enhanced learning recognizes that there are many different learning pathways and many different articulations of knowledge. ICTs allow learners to explore and discover rather than merely listen and remember. The World Wide Web (WWW) also provides a virtual international gallery for students' work (Loveless, 2003). ICT can engage and inspire students, and this has been cited as a factor influencing ready adoptors of ICT (Long, 2001; Wood, 2004).

The tools and techniques available for visual arts expression have expanded tremendously with the advent of new hardware and software, and ICT provides unique opportunities to extend visual arts teaching and learning. The society now demands new visual literacy for its citizens to function effectively in social and employment contexts. Furthermore, the very nature and interests of students themselves contribute to the changing face of visual arts education. ICT presents unique opportunities for supporting - Creativity and Extending Visual Arts. ICT presents unique opportunities for supporting creativity (Brown, 2002) and extending visual arts "beyond clay, crayons and paint" (Stankiewicz, 2004: 88). This potential was recognised as far back as the 1980s when Crowe (1988) commented that ICT could assist with exploring design problems, enhance artistic decision making and provide new opportunities for learning. Since then the literature has continued to highlight the potential for ICT in supporting visual arts teaching: "For visual education these are incredibly exciting times offering new possibilities" (Long, 2001: 262). Drawing and painting software, digital still and video cameras, electronic portfolios, scanners, colour laser printers, samplers and sound mixers, image manipulation, video editing, 3D animation, Internet and web page construction can all play a role in supporting students' artistic expression (Ashford, 2002; Brown, 2002; Neylon, 1996; Taylor, 1999). Furthermore, as a medium for exploring solutions to design problems (Crowe, 1988; Freedman, 1991; Matthews, 1997), students are able to record and save ideas quickly, manipulate line and colour, modify and incorporate images and employ motion (Hubbard and Greh, 1991).

ICT can allow students who might not possess skills with traditional media to focus more on the message and less on execution of art works, thus enhancing self expression (Long, 2001; Wang, 2002; Wood, 2004). Mistakes can be easily corrected, resulting in decreased anxiety and promotion of experimentation, which lies at the heart of creativity (Freedman, 1991; Hicks, 1993; Wood, 2004). While new technologies do not, of course, replace traditional art processes they do extend the possibilities of art expression, communication and perception (Wang, 2002; Wood, 2004). With an ever increasing emphasis on still and animated imagery, symbols and iconography in society, analysis, interpretation, extrapolation and evaluation of visual imagery has become just as important as art creation. Students need to be wise consumers, familiar with how the mass media operates (Hicks, 1993). Visual arts education has an important role to play in preparing students as visually literate and critical members of society (Brown, 2002; Schwartz, 1991). Majority of the sample respondents opined that the use of digital media has expanded and new career opportunities have opened up for visual artists. The students are strongly convicted that with knowledge, skills and proficiency in digital art and design would create a better opportunity to obtain employment in commercial visual arts contexts, such as advertising, film, animation and other computer graphic industries. Technology provides exciting opportunities for enriching and transforming visual arts teaching, providing teachers and students alike with new tools to access, organise and present information and to enrich lessons through multimedia (Bridwell & McCoy, 1991; Garnons-Williams, 2002; Schwartz, 1991; Wood, 2004). Technology enables the establishment of communities of practice and cooperative learning (Henning, 2000; Hicks, 1993; Neylon, 1996), with communication not only between students and teachers, but between students from different schools, countries or cultures, and with practising artists from around the globe.

6. Concluding Remarks

If there is one truism that has emerged in the relatively brief history of ICT use in education, it is this: It is

not the technology but how you use it! Put another way: “How you use technology is more important than if you use it at all...[and] unless our thinking about schooling changes along with the continuing expansion of [ICTs] in the classroom then our technology investment will fail to live up to its potential.” Technology then should not drive education; rather, educational goals and needs, and careful economics, must drive technology use. Only in this way can educational institutions in effectively and equitably address the key needs of the population, to help the population as a whole respond to new challenges and opportunities created by an increasingly global economy. The paper has argued that ICTs have impacted on educational practice in education to date in quite small ways but that the impact will grow considerably in years to come and that ICT will become a strong agent for change among many educational practices. Extrapolating current activities and practices, the continued use and development of ICTs within education will have a strong impact on:

- What is learned;
- How it is learned;
- When and where learning takes place;
- Who is learning and who is teaching.

The upshot of all this activity is that we should see marked improvements in many areas of educational endeavour. Learning should become more relevant to stakeholders’ needs, learning outcomes should become more deliberate and targeted, and learning opportunities should diversity in what is learned and who is learning. At the same time, quality of programs as measured by fitness for purpose should continue to grow as stakeholder groups find the offerings matched to their needs and expectations. ICT can make a substantial difference by disseminating content and new ways of learning. It needs to be carefully integrated. We should try to bring together the technology with education. We need to combine use of ICT with traditional methods of education. We can try to enhance blended learning which refers to the learning models that combine traditional classroom practice with e-learning solutions. After having an online mentoring sessions with their teacher through chat this can be followed by a periodic face-to-face instruction. ICTs are tool and not an end in themselves. Schools should therefore focus on what they need to use the tool for, in the first place. Choosing and deploying ICTs for education must stem from, and be driven by the desired educational objective(s) and outcome. Thus it should be “ICT *for* education but not education for ICT”.

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